The way the Bay Area handles growth and related infrastructure needs will be the critical test for regional planning as the new century unfolds. The success of the Bay Area economy accelerated the pace of job growth in the last decade, but housing and transportation supply were not able to keep up. Given the latest set of population and employment projections for the next 25 years, it is clear that transportation challenges will be even greater in the future as we look for more effective ways to serve the travel needs of the region's residents and employers, and the growing numbers of workers who commute to Bay Area jobs from outside the region.

To probe the dimensions of this challenge, MTC employs the latest in computer-based travel forecasting technology to determine how much travel will occur, where people will travel, and how they will travel. These tools help us understand how the investments proposed in the Regional Transportation Plan will lead to better mobility.

Population, Employment and Travel

In 2025, the Bay Area will be home to more than 8.2 million people, or some 1.3 million more people than live here today. This is unquestionably a large jump, but the 19 percent increase actually reflects a slight slowdown in the rate of population growth compared to previous decades. Renewed economic expansion is expected to create over 1.2 million new jobs in the region by 2025, a 33 percent increase. Projections for job and population growth are not in balance, however. This will lead to a net in-commute of some 300,000 workers a day from outside the region unless Bay Area housing development accelerates or fewer new jobs are created.

San Francisco and San Jose are expected to lead the Bay Area in the total numbers of new jobs created in the years ahead. But while some of the growth in population will involve infill development in established urban centers, seven out of the top 10 growth cities are located toward the outer periphery of the Bay Area, where land is more readily available (see chart at right).

Top 10 Job Growth Cities

City	2000-2020 Change
San Francisco	102,800
San Jose	99,420
Santa Rosa	43,740
Fremont	35,400
Oakland	29,450
Fairfield	29,120
Santa Clara	26,480
Pleasanton	24,540
Alameda	24,380
San Ramon	22,390

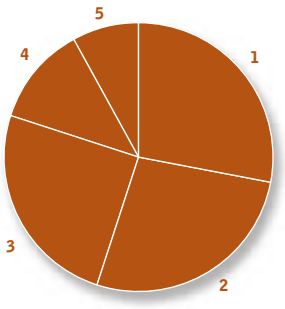
Source: ABAG Projections 2000

Top 10 Population Growth Cities

City	2000-2020 Change
San Jose	129,300
Fairfield	49,100
Oakland	37,500
Santa Rosa	36,800
Dublin	35,100
San Ramon	34,800
Antioch	31,300
Vacaville	30,300
Santa Clara	29,000
Brentwood	27,400

Source: ABAG Projections 2000

Daily Trips by Purpose in 2025



		Number of Trips	Percent of Total
1	Other*	7,376,000	28%
2	Work	7,078,000	27%
3	Shopping	6,645,000	25%
4	Recreation	3,143,000	12%
5	School	1,985,000	8%
	TOTAL**	26,227,000	100%

* In contrast to categories 2 through 5, which refer to trips that originate from the home, "Other" refers to all trips that originate from places other than home (e.g., work-based errands, etc.)

** Does not include an estimated 356,000 daily trips by commercial trucks.

A further issue is the rate of growth, since fast-paced additions of new homes and business parks can occur well in advance of the transportation facilities to serve them, as these facilities typically take a number of years to plan, design and deliver. A particularly daunting trend is the increased need for transportation improvements at the region's gateways with our neighboring counties, since triple-digit percentage population growth is projected for most of these counties in the next 40 years, according to the state Department of Finance.

Other changes in the Bay Area's demographics will have strong transportation implications as well. The number of people over age 65 will almost double by 2020, when seniors will constitute about 19 percent of the Bay Area population. Meeting the mobility needs of this sector of the population will mean changes in a number of areas, from the design of cars to funding for paratransit systems.

As an indicator of the powerful socio-economic changes occurring within California, the percentage of non-Hispanic whites will decline to just 41 percent of the total Bay Area population in 2020. This will be a drop from 61 percent in 1990. Latinos will increase to 24 percent of the Bay Area population and the combination of Asians, Native Americans and others will grow to 27 percent. The African-American population will remain steady at about 9 percent of the Bay Area total. Changing demographics could increase disparities between income groups, possibly leaving some residents without adequate travel options.

The Three-Ring Development Pattern

Transportation decisions are made within the context of emerging regional development patterns defined by local plans and development decisions. These land-use patterns can be analyzed as a set of concentric rings. At the center are the urban cores, consisting of San Jose, San Francisco and Oakland (plus Berkeley and Emeryville). Around these cities is the Bay Plain, consisting of the inner suburban communities between the Bay and the surrounding hills. The outer ring is comprised of the more distant suburbs and agricultural land that make up the rest of the nine-county region.

The outer ring will account for the overwhelming majority of new residential development in the region. The Association of Bay Area Governments (ABAG) measures this by the amount of raw land being developed for residential use. Residential density, of course, will be much higher in the urban core than in other areas. And the lion's share of the conversions of older commercial and industrial buildings to residential use will take place in San Jose, San Francisco and Oakland/Berkeley/Emeryville. But these cities combined will put only about 750 acres of now-vacant land into residential development over the next 25 years. This compares to 17,500 acres in the Bay Plain and 78,600 acres in the outer ring (see chart on next page).

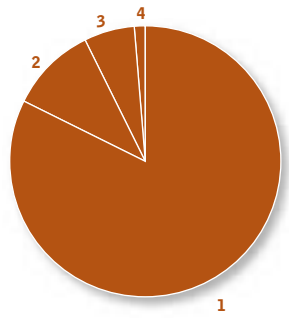
The Nature of Travel in 2025

The region's appetite for travel is propelled by many factors, including the need to get to work, attend school, shop, buy groceries, see a sports event, or catch a flight at an airport. Estimating the amount of travel that will occur in the future is a complex task that involves determining the types of trips made, the geographic origins and destinations of trips, and the travel time and cost factors that influence decisions about whether people will use a car, take transit, or bike/walk to make their trips. Every 10 years, MTC updates information on personal travel behavior by collecting key information from a sample of Bay Area households (including retired people and people who work at home). This information is then fed into computer models to evaluate changes in travel demand and overall mobility. This analysis is done both at the regional and corridor levels.

The chart at the top of the facing page shows the types of trips that Bay Area residents will make in 2025. Work trips typically define the peak demand for the transportation system because of their number, length and timing. Seasoned travelers know that it is increasingly difficult to avoid bottlenecks that regularly occur throughout the Bay Area, and the 10 worst bottlenecks (see table on page 18) affect the greatest number of travelers.

Another way to put the travel projections into perspective is to compare them to other indicators, as shown in the graph at the top of the following page. Travel activity as reflected by daily trips generally increases at a higher rate than population growth, but at a lower rate than employment growth. Powered primarily by the growth in both population and jobs, total daily person trips in the region are forecast to increase by roughly 30 percent, from about 20 million in 1998 to about 26 million in 2025. This translates into increased trips on each mode — by auto (up 27 percent), by transit (up 43 percent), by bicycle (up 27 percent), and by walking (up 46 percent).

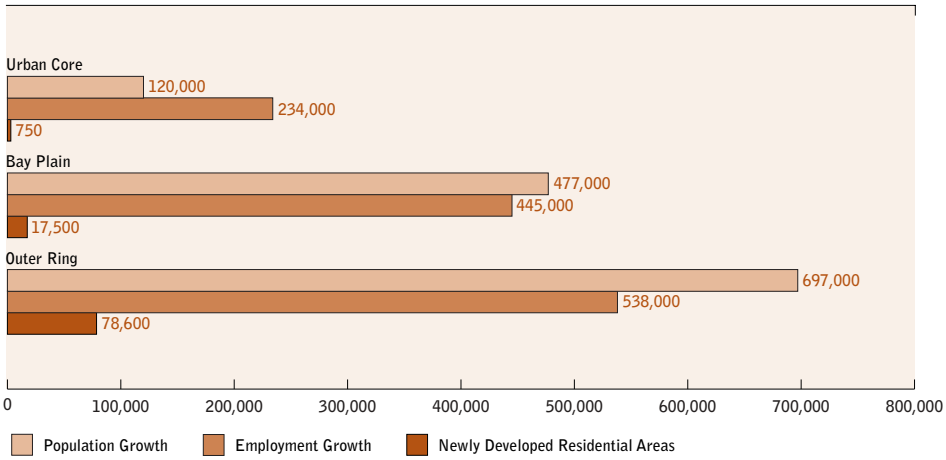
Daily Trips by Mode in 2025
Work and Non-work Trips



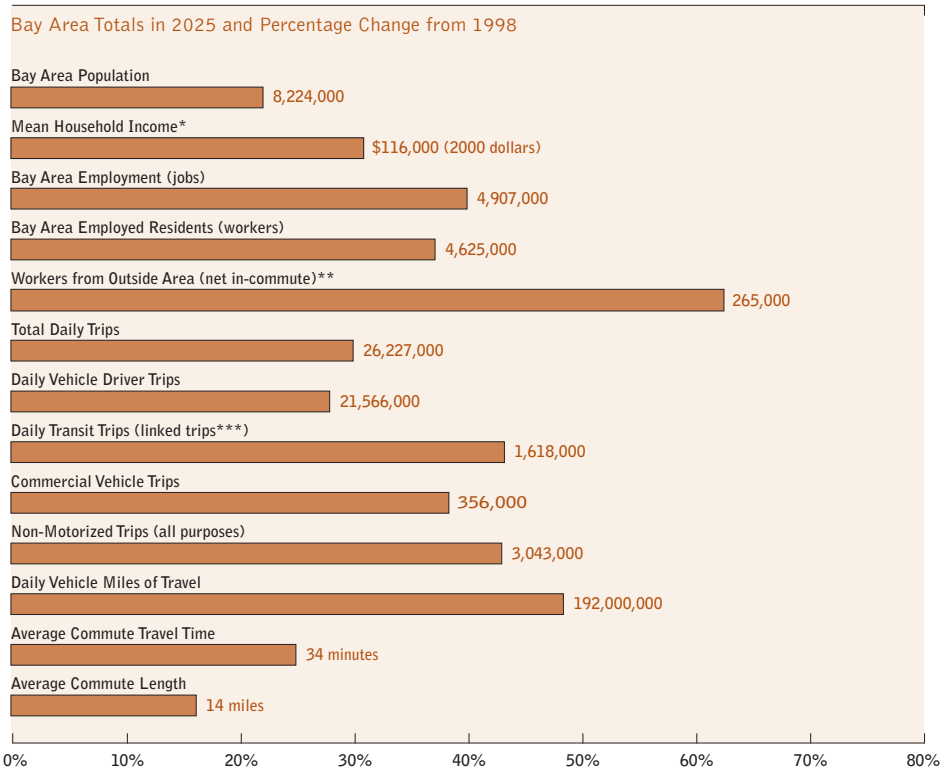
		Percent of Total Trips
1	Auto*	82.2%
2	Walk	10.3%
3	Transit	6.2%
4	Bicycle	1.3%

* Driver and passengers

Population Growth, Employment Growth and New Residential Acreage, 2000–2025

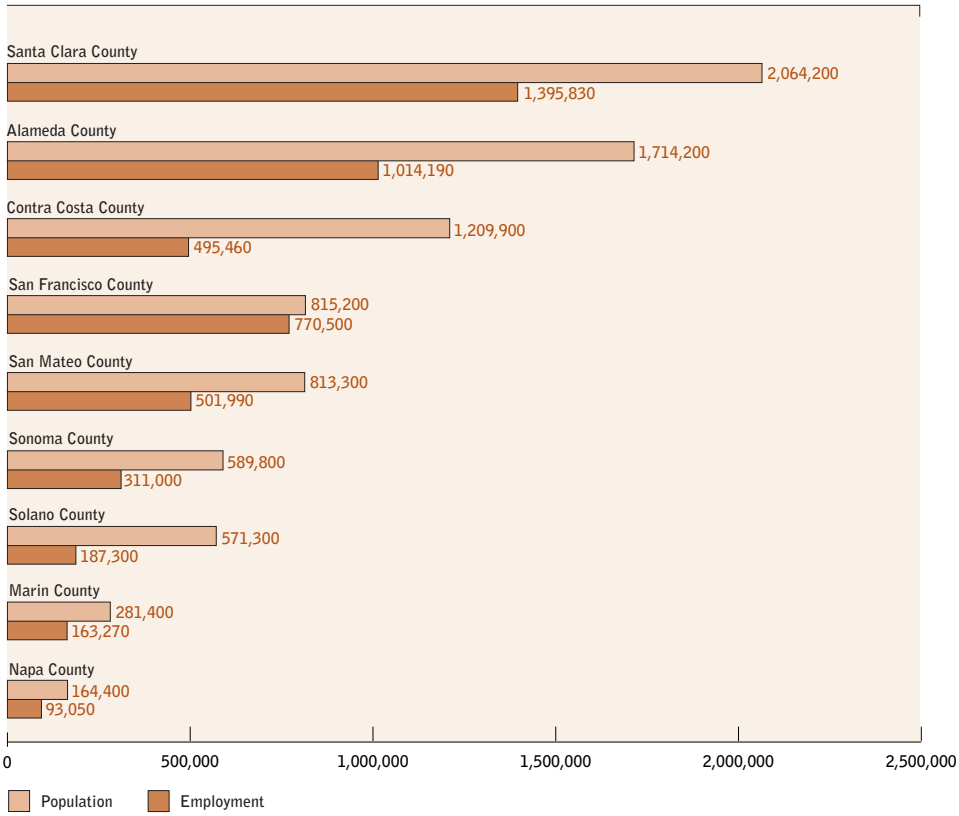


Regional Demographic and Transportation Indicators, 2025



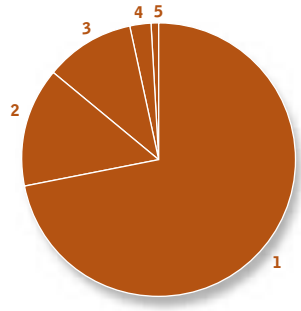
* For years 2000–2025, ** For years 2000–2020, *** Linked trips may include use of more than one transit system.

Bay Area Overview by County, 2025



Automobiles will continue to be the most popular travel mode, accounting for 82 percent of all trips (see pie chart on page 15). This figure includes work and non-work trips, and passengers as well as drivers. The combination of single-occupant vehicles and minimum two-person carpools will boost the automobile's share of all work trips in 2025 to 86 percent (see chart at right). Transit, which will account for just 6 percent of all trips in 2025, will make up more than 10 percent of all work trips. Walking will account for a smaller share of work trips than for non-work trips.

Work Trips by Mode in 2025



		Percent of Total
1	Drive Alone	71.9%
2	Carpool	14.1%
3	Transit	10.6%
4	Walk	2.5%
5	Bike	0.9%

Daily Travel Patterns

Bay Area residents crisscross the region daily in an intricate pattern of trips that is largely shaped by where people live and work. This pattern can be captured in broad strokes, but is difficult to precisely predict for a period extending out as far as 25 years. We have assembled our best estimates of these trip patterns in the chart below.

Most people's trips in 2025 will begin and end within the same county where they live. These intra-county trips now constitute 84 percent of all trips and 70 percent of work trips, and this percentage will remain remarkably stable over the next 25 years.

Work trips, as noted previously, exert the greatest pressure on regional transportation facilities and services. As the table at the top of the following page indicates, workers who live in job-rich counties will have significantly shorter commutes than workers in

Person Trips Between and Within Counties in 2025

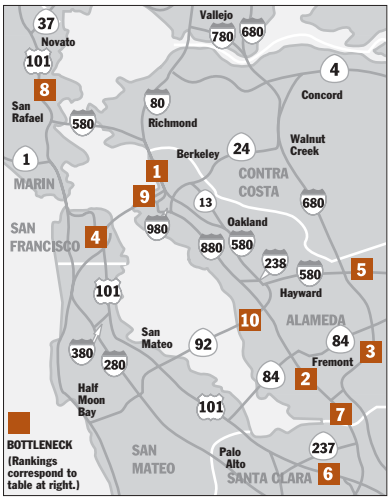
Thousands of Daily Trips in 2025 and Percentage Change from 2000

Origin/Destination	Alameda	Contra Costa	Marin	Napa	Santa Clara	San Francisco	San Mateo	Solano	Sonoma	TOTAL
Alameda	4,067	203	14	4	276	242	144	13	8	4,971
	22%	37%	62%	74%	20%	30%	25%	52%	93%	23%
Contra Costa	431	2,824	15	11	47	195	41	58	9	3,630
	36%	35%	51%	67%	37%	31%	30%	42%	86%	35%
Marin	14	10	722	3	4	107	12	4	33	908
	16%	29%	16%	63%	10%	11%	10%	39%	70%	17%
Napa	6	9	3	436	1	6	1	19	35	517
	20%	31%	45%	39%	49%	20%	21%	54%	79%	41%
San Francisco	118	36	35	2	51	2,171	269	5	7	2,694
	14%	21%	22%	59%	6%	7%	14%	38%	55%	9%
San Mateo	93	21	10	1	308	426	2,067	2	2	2,930
	27%	35%	36%	45%	16%	19%	15%	43%	52%	16%
Santa Clara	176	18	3	1	6,694	54	238	2	2	7,187
	38%	40%	45%	54%	21%	32%	25%	50%	44%	21%
Solano	52	119	13	43	7	38	14	1,301	10	1,597
	38%	47%	60%	123%	34%	37%	37%	55%	87%	54%
Sonoma	10	7	53	29	3	26	5	5	1,653	1,791
	1%	9%	17%	27%	28%	-2%	-5%	31%	39%	37%
TOTAL	4,967	3,248	868	529	7,392	3,264	2,791	1,410	1,758	26,227
	23%	36%	18%	44%	20%	12%	17%	54%	41%	24%

Numbers That Appear in Color: Rank in top 10 for growth in number of intercounty trips

Average Commute Distance in 2025

County	Distance	% change from 1998
Alameda	14.4	+19%
Contra Costa	17.3	+11%
Marin	16.4	+15%
Napa	14.4	+13%
San Francisco	9.4	+22%
San Mateo	14.2	+18%
Santa Clara	11.6	+17%
Solano	19.7	+5%
Sonoma	15.3	-4%
Bay Area Average	14.0	+16%



Four of the 10 worst Bay Area bottlenecks involve traffic into or out of Silicon Valley. Three others involve approaches to the Bay Bridge.

other parts of the Bay Area. Commutes for San Francisco residents will be particularly short, due to both the number of jobs and the density of development in the city. Santa Clara County residents will have the next shortest average commutes due to the proximity of Silicon Valley jobs. Not surprisingly, workers traveling into the region from adjacent counties typically will face the longest commutes. Within the Bay Area proper, the longest average commutes will be in Solano County, which is farther from major job centers, and in Contra Costa County. (Note: These county-level commute distance figures do not show variation within counties, where residents of central San Jose, Berkeley/Albany and Santa Rosa, for instance, typically will have shorter commutes than will other residents of Santa Clara, Alameda or Sonoma counties).

10 Worst Congestion Locations in 2001*

2001 Rank	Location	Delay in Vehicle Hours	2000 Rank
1	**Interstate 80, westbound, a.m.** — Alameda/Contra Costa County Route 4 to Bay Bridge metering lights	9,410	1
2	**Interstate 880, southbound, a.m.** — Alameda County South of Route 84 to north of Dixon Landing Road	8,880	3
3	**Interstate 680, southbound, a.m.** — Alameda County Sunol Road to south of Route 262	8,510	2
4	**Interstate 80, eastbound and U.S. 101, northbound, p.m.** — San Francisco County Army Street to west end of Bay Bridge	5,050	5
5	**Interstate 580, eastbound, p.m.** — Alameda County Hopyard Road to west of El Charro	5,030	13
6	**U.S. 101, southbound, p.m.** — Santa Clara County Great America Parkway to 13th Street	4,100	4
7	**Interstate 880, northbound, p.m.** — Santa Clara/Alameda County U.S. 101 to Dixon Landing Road	4,000	12
8	**U.S. 101, southbound, a.m.** — Marin County Rowland Boulevard to Interstate 580	3,230	6
9	**Interstate 880, northbound, a.m.** — Alameda County 1 mile north of 7th Street to Bay Bridge	2,920	10
10	**Route 84, westbound, a.m.** — Alameda County Newark to Dumbarton Bridge toll plaza	2,860	11

Source: Caltrans District 4

*Rankings are for routes in which continuous stop-and-go conditions occur with few, if any, breaks in the queue. Thus, corridors that have equally severe delays but where congestion is broken into several segments may rank lower in this type of congestion listing.

Travel Corridors

Travel corridors are geographic areas that are defined by physical boundaries and transportation systems, with each corridor having its own distinct travel pattern. The 16 corridors identified in this RTP provide the most relevant regional context for transportation planning, are well used by the traveling public, and generally have the most visible transportation projects, which are either ongoing or proposed for the future.

This RTP identifies interregional gateways as a distinct corridor for the first time. The number of commuters who travel to Bay Area jobs from residences outside the nine-county region will continue to rise as a result of the high prices and low production

rates for new housing within the Bay Area. Daily trips coming from outside the region are forecasted to increase from about 164,000 trips in 2000 to some 265,000 trips in 2020. The Altamont Pass from the Central Valley into the Bay Area is the busiest in-commute corridor and also the fastest growing, as commuters from San Joaquin, Stanislaus and Merced counties wind their way over Interstate 580 or take the Altamont Commuter Express trains. These growing in-commutes for the two peak morning hours are ranked as follows:

In-Commute Through Interregional Gateways, 1998-2025

Daily trips during two peak morning hours

Counties of Origin	1998	2025	Percent Increase
San Joaquin/Stanislaus/Merced	10,600	17,000	+ 60%
Yolo/Sacramento/Placer	9,500	16,200	+ 71%
Santa Cruz	6,600	7,000	+ 5%
San Benito/Monterey	4,400	5,800	+ 30%

Regional Screenlines

Another way to assess future travel patterns is to look at the number of trips made in either direction across regional "screenlines," that is, the number of trips crossing a particular geographic location, typically the boundary line between two counties. Many of the major transportation improvements included in this RTP are directed at trips across these screenlines, which tend to be more regional in nature.

Examples of important regional screenlines include trips on Interstate 680 over the Sunol Grade, through the Caldecott Tunnel in the East Bay, between San Francisco and the Peninsula, and across the Bay on toll bridges, BART or ferries. Each screenline is briefly discussed on the following pages in terms of the major transportation improvements under consideration and the projected growth in trips by all modes between 1998 and 2025. Growth rates for most of the screenlines exceeds the estimated average growth of 30 percent for all regional trips.

Transbay Travel Over the Bay Bridges

Screenline	Daily Trips 1998	Daily Trips 2025	Percent Increase
Bay Bridge Corridor (includes bridge traffic, BART and ferries)	540,000	769,000	+42.5%
San Mateo-Hayward and Dumbarton bridges	177,000	262,000	+47.8%
Richmond-San Rafael Bridge	48,000	86,000	+79.1%

Major projects include replacement of the east span of the Bay Bridge, widening the viaduct section of the San Mateo-Hayward Bridge to six lanes, and consideration of rail service over the Dumbarton railroad bridge. MTC is currently conducting the Bay Crossings Study to evaluate the long-term potential for new Bay crossings by bridge, tunnel or water with different combinations of road, rail, bus, ferry and traffic management strategies.

Bay Area Travel Corridors

San Francisco Bay Region

Golden Gate

North Bay East-West

Napa Valley

Eastshore-North

Delta

Diablo

Tri-Valley

Sunol Gateway

Eastshore-South

Fremont-South Bay

Silicon Valley

Peninsula

San Francisco

Transbay Corridors

Interregional Gateways

Peninsula

Screenline	Daily Trips 1998	Daily Trips 2025	Percent Increase
Between San Francisco and the Peninsula (San Mateo and Santa Clara counties)	660,000	800,000	+21.2%
Between San Mateo and Santa Clara counties	420,000	547,000	+30.0%

With the completion of BART to San Francisco International Airport and the intermodal Caltrain connection in Millbrae, the transit focus for the future will be on Caltrain improvements for north/south travel along the entire Peninsula (express service, electrification, potential downtown San Francisco extension to a rebuilt Transbay Terminal). Highway improvements will focus on the addition of auxiliary lanes along U.S. 101, as well as multiple interchange improvements.

Fremont-South Bay

Screenline	Daily Trips 1998	Daily Trips 2025	Percent Increase
East Bay to/from Santa Clara County	212,000	296,000	+39.6%

A major transit project under review in the Regional Transit Expansion Program is the proposed BART extension from Fremont to San Jose, linking also to the east-west light rail line serving the Golden Triangle portion of Silicon Valley. This corridor has been studied on many different occasions, and is currently undergoing a new major investment study to identify the preferred rapid transit solution.

Interstate 680 Sunol Grade

Screenline	Daily Trips 1998	Daily Trips 2025	Percent Increase
Tri-Valley/Central Valley across Sunol Grade	119,000	226,000	+90.1%

This corridor has been among the most congested in the Bay Area for several years, and has been the focus of intense efforts to develop new carpool lanes. Other longer-term options include increased express bus service, increased Altamont Commuter Express commuter rail service, and value pricing (under study).

Caldecott Tunnel

Screenline	Daily Trips 1998	Daily Trips 2025	Percent Increase
East–west trips through the Caldecott Tunnel	303,000	433,000	+42.7%

A recent study evaluated a suite of strategies for improving travel through this bottleneck, including better traffic management, improved transit, and different configurations for a new fourth bore, now proposed for construction in this RTP.

Route 4 in Contra Costa County

Screenline	Daily Trips 1998	Daily Trips 2025	Percent Increase
East–west trips over Willow Pass Grade	174,000	271,000	+56.4%

Improvements to Route 4 are a high priority due to eastern Contra Costa County's current and projected population growth, which exceeds transportation capacity. Carpool lane projects are being implemented along the eastern portion of the route and longer-term rail options continue to be reviewed.

North Bay to East Bay

Screenline	Daily Trips 1998	Daily Trips 2025	Percent Increase
Carquinez Bridge	115,000	182,000	+57.5%
Benicia-Martinez Bridge	92,000	152,000	+64.6%

Major bridge projects are or soon will be under way to replace the western span of the Carquinez Bridge and construct a new Benicia-Martinez Bridge for added capacity. Transit options, which could be developed further in the future, include the Capitol Corridor intercity rail service and express buses.

Marin/Sonoma

Screenline	Daily Trips 1998	Daily Trips 2025	Percent Increase
Local trips between Marin and Sonoma counties	67,000	86,000	+28.0%
Local trips between Marin and Sonoma counties including trips between Sonoma and San Francisco	87,000	122,000	+40.0%
Crossing Golden Gate Bridge	170,000	215,000	+26.5%

Major improvements to the U.S. 101 "Novato Narrows" section between Novato and Petaluma are being planned, along with a potential commuter rail system linking the two counties. Job growth in the North Bay is mitigating some of the demand for increased travel to San Francisco.